

# **Materials Handling, Storage, Use, and Disposal**

## **10-Hour Construction Outreach**

# Materials Handling, Storage, Use, and Disposal

- Lesson Overview
  - Types of material handling equipment.
  - Hazards associated with material handling activities
  - Prevention of hazards associated with material handling equipment
  - Employer requirements to protect workers from material handling hazards

# Types of Equipment

## Conveyors



Source: OSHA

## Powered Industrial Trucks



Source: TEEX-Harwood

# Types of Equipment

## Cranes



Source: OSHA

## Slings



Source: OSHA

# Factors Contributing to Injuries

- Weight and bulkiness of objects
- Bending, twisting, turning movements



Source: OSHA



Source: OSHA

# Hazards

- Improper operation of equipment
- Accumulated materials or clutter



Source of photos: OSHA

# Hazards

- Unsafe conditions of materials or containers
- Flammability or toxicity of some materials



Source: OSHA

# Hazards

- Weight of materials
- Binding ties or other devices that secure bundles or bound materials



Source: OSHA



Source: OSHA

# Hazards

- Falling objects
- Lifting, pushing, pulling, or otherwise manually moving large, heavy items



Source: OSHA



Source: OSHA

# Hazards

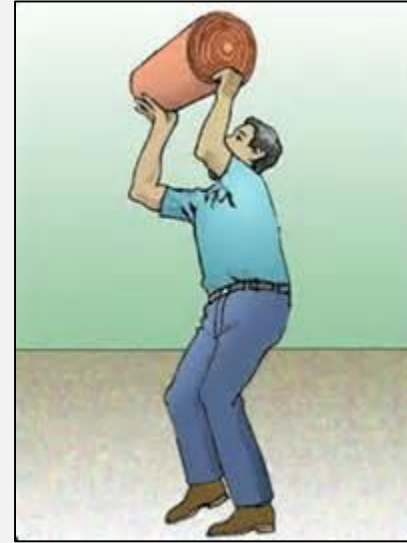
- Improperly stacked materials
- Struck-by or caught-in/-between hazards



Source of photos: TEEX - Harwood

# Injuries

- Types of injuries commonly reported
  - Sprains, strains, tears
  - Soreness and pain
  - Bruises and contusions
  - Cuts, lacerations, and punctures



Source: OSHA

# Injuries

- Examples of events or exposures leading to injuries
  - Contact with objects and equipment
  - Transportation incidents
  - Exposure to harmful substances or environments



Source: OSHA



Source: OSHA

# Injuries

- Falls, slips, trips, or loss of balance
- Repetitive motion
- Overexertion



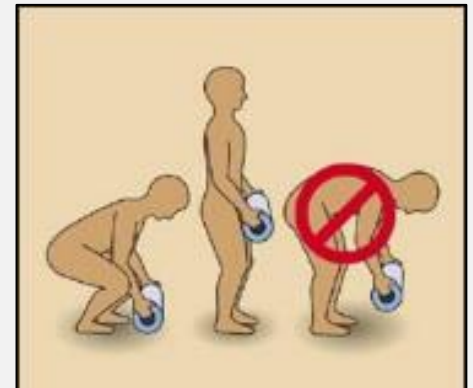
Source: OSHA



Source: OSHA

# Preventing Hazards

- Moving materials manually
  - Use devices to assist with holding loads
  - Wear PPE
  - Use proper lifting technique
  - Seek help for oversized loads
  - Use blocking materials



Source of photos: OSHA

# Preventing Hazards

- Cranes
  - Major types of crane accidents
    - Contact with power lines
    - Overturns
    - Falls
    - Mechanical failure



Source: OSHA

# Preventing Hazards

- Hoisting tons of material, steel, and concrete with cranes
- Operated only by thoroughly trained and competent workers



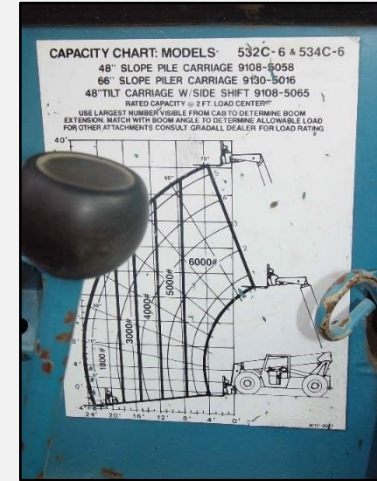
Source: OSHA



Source: TEEX - Harwood

# Preventing Hazards

- Eliminate/reduce crane hazards by:
  - Knowing
    - Load
    - Capacity of the crane
    - When the load is safe to lift
  - Always checking crane load chart and never exceed load limits



Source: TEEX - Harwood



# Preventing Hazards

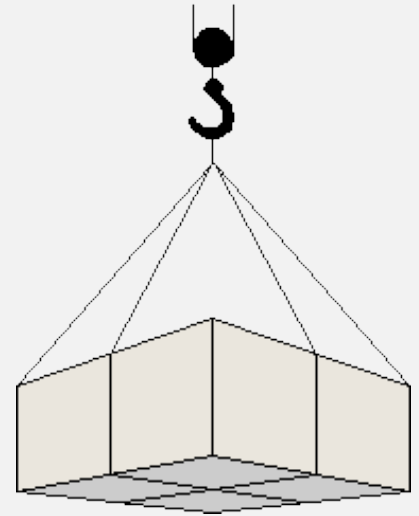
- Inspection of crane by a qualified person
  - Modified, repaired, or adjusted
  - Post-assembly
  - At least every 12 months
  - Equipment not in regular use
- Visual inspection by a competent person
  - Prior to each shift
  - Monthly



Source: OSHA

# Preventing Hazards

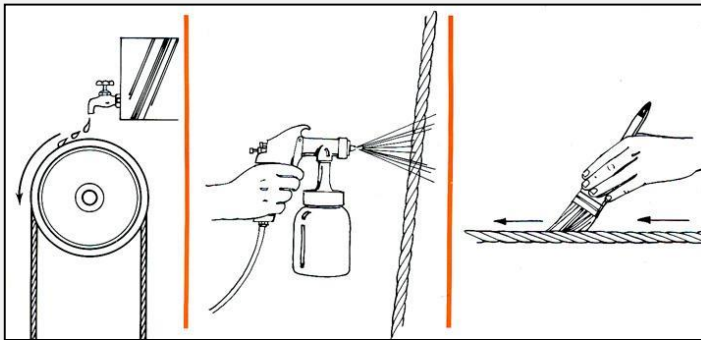
- Slings
  - Connect a crane hook to a load
  - Proper selection
  - Inspection



Source of photos: OSHA

# Preventing Hazards

- Reduce sling hazards by:
  - Lubricated
  - Do not shorten with knots, bolts, or other devices, or kink legs
  - Keep clear of loads
  - Avoid sudden movement



Source: OSHA



Source: OSHA

# Preventing Hazards

- Forklifts
  - Main causes of injuries
    - Forklift overturns
    - Forklift striking workers on foot
    - Persons crushed by forklifts
    - Persons falling from forklifts



Source: OSHA

# Preventing Hazards

- Illegal forklift operators
  - Anyone under 18
  - Anyone not properly trained and certified



Source of photos: OSHA

# Preventing Hazards



- Driving the forklift
  - Obstructed vision
  - Travel path
  - Approaching people
  - Elevated platform
  - Seat belts and ROPS
  - Raising/lowering forks
  - Safe distance



Source of photos: OSHA

# Preventing Hazards

- Elevating workers with forklift
  - Standing on forks
  - Lifting personnel
  - Approved lift platform
  - Restraining means



Source: OSHA

# Preventing Hazards

## – Driving forklift on Grades/Ramps

- Use extreme caution
- No turns
- Tilting and raising load
- Point load up the incline



Source of photos: OSHA



# Preventing Hazards

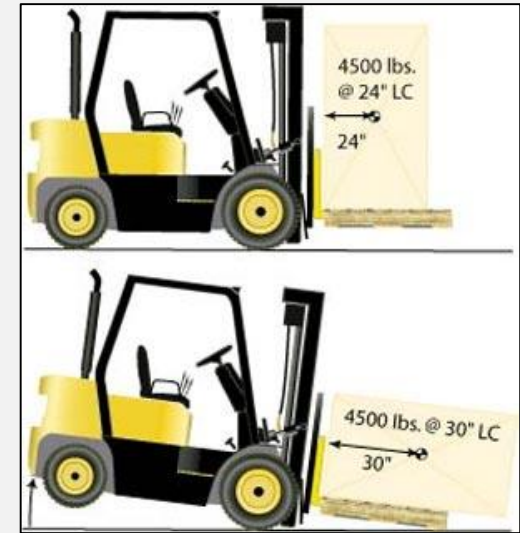
- Forklift operating speed
  - Tip-overs
  - Turning
  - Avoiding collisions
  - Wet and slippery floors
  - Ascending/descending
  - Obstructed vision



Source of photos: OSHA

# Preventing Hazards

- Avoiding Excess Weight
  - Do not exceed weight capacity of forklift.
  - Center loads and secure to keep from shifting to maintain balance of weight



Source: OSHA

# Preventing Hazards

- Use of Dock Boards for Loading/Unloading
  - Bridging space
  - Securing portable dock boards
  - Handholds for dock boards



Source: OSHA

# Preventing Hazards

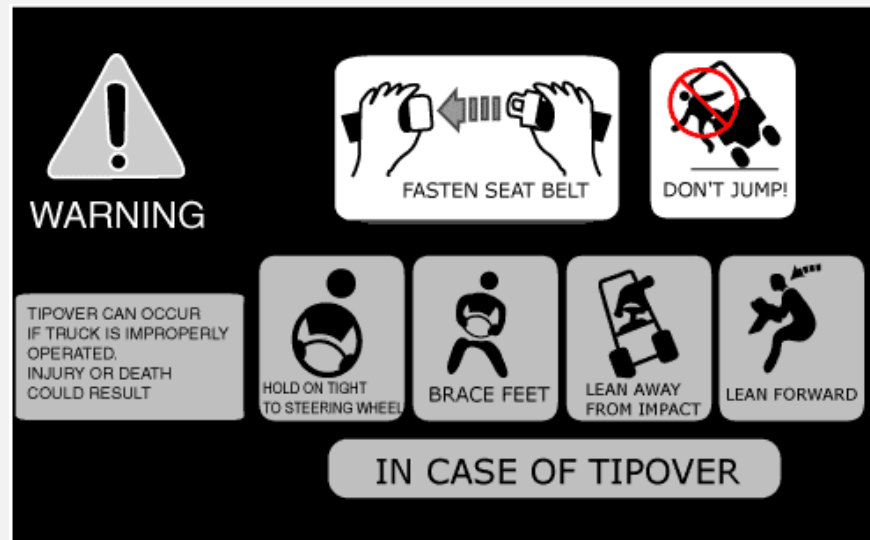
- Exiting the Forklift
  - Set brake, lower forks/lifting carriage, neutralize controls
  - Stand-up type forklift
- Riding the forklift
  - No passengers allowed
  - Exception – seat is provided



Source of photos: OSHA

# Preventing Hazards

- Avoiding Struck-by/Crushed-by
  - Don't jump from an overturning, sit-down type forklift.
  - Stay with the truck, hold on firmly, and lean in the opposite direction of the overturn.



Source: OSHA

# Preventing Hazards

- Forklift Training – do not operate a forklift without proper training and licensing.
- Reporting Damage – any damage or problems that occur to a forklift during a shift should be reported to the supervisor.



Source: OSHA

# Preventing Hazards

- Earth-Moving Equipment
  - Scrapers
  - Loaders
  - Crawlers
  - Bulldozers
  - Off-highway trucks
  - Graders
  - Tractors



Source of photos: TEEX - Harwood

# Preventing Hazards

- Earth-Moving Equipment
  - Seatbelts
  - Reverse gear not used unless that piece of equipment has:
    - Back-up signal alarm or
    - Signaler
  - Operator properly trained



Source: OSHA

# Employer Requirements

- Comply with OSHA standards related to materials handling, including:
  - Training requirements, including requirements for forklift training.
  - Inspection requirements



Source of photos: OSHA



# Employer Requirements

- Comply with manufacturers' requirements and recommendations for materials handling equipment.

**WARNING** IMPROPER OPERATION OR MAINTENANCE  
COULD RESULT IN INJURY OR DEATH

MODEL \_\_\_\_\_ SERIAL No. **3FM1000000**  
TYPE **LPS** TRUCK WT. **8,600** lbs

CAPACITY OF STANDARD TRUCK WITH SIMPLEX MAST  
AND FORKS: **5,000**

MAXIMUM HEIGHT of 130 IN. RATED CAPACITY WITH  
OPTIONAL MAST AND/OR ATTACHMENT LISTED BELOW.

MAST: VERTICAL

A	B	FORKS ONLY	ATTACH
in	in	in	in
156	24		4,500

24in

Diagram showing mast height A and B.

ATCHMODEL **Sideshifter**

MEETS DESIGN SPECS ANSI B56.1

Source : OSHA

# Recognizing Hazards

Identify potential hazards and possible solutions:



Source of photos : OSHA

# Recognizing Hazards

Identify potential hazards and possible solutions:



Source: OSHA



Source: TEEX - Harwood

# Recognizing Hazards

Identify potential hazards and possible solutions:




Source of photos : TEEX Harwood

- **What three steps need to take place before an employee may operate any piece of mobile equipment?**
  1. Class room instruction and written test
  2. Equipment overview and hands-on
  3. Final operational evaluation

# • Why do we fill out pre-operation inspection sheets?

1. Keep up with equipment maintenance
2. Ensure equipment is safe to operate
3. Compliance

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One Stop • Many Services

## Fork Lift (LP, Gas, Diesel)

### Pre-Operational Inspection Form

Operator Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Unit Number: \_\_\_\_\_ Hour Meter Reading: \_\_\_\_\_

What are you inspecting?	What are you looking for?	S	U	Operator Comments
<b>From the Ground</b>				
Fork Condition	Excessive Vibration or Damage, Cracks			
Steel Condition	Excessive Vibration, Damage, Leaks			
Lift Mechanism (Liquids, Air/Oil)	Excessive Vibration or Damage			
Hydraulic Lift Cylinders	Vibration, Damage, Leaks, Cracks			
Tires, Lug Nuts, Bolts	Inflation, Damage, Wear/Cracks			
Underneath of Machine	Leaks, Damage			
Ways and Handrails	Condition and Cleanliness			
Fuel Tank (Propane, Diesel)	Fuel Level, Damage, Leaks			
Hydraulics On Tank	Fuel Level, Damage, Leaks			
Went & Fuel Controls	Vibration, Damage, Leaks			
Batteries & Vent Down	Cleanliness, Loose Bolts & Nuts			
Overall Machine	ORDER OF INSPECTION IS DONE, LOOK FOR GUARDS, CLEANLINESS			
<b>Engine Compartment</b>				
Engine Oil	Fuel Level			
Engine Coolant	Fuel Level			
Air Filter	Restriction Indicator			
Radiator	Fan Blockage, Leaks			
Air Hoses, Fittings	Cracks, Vibration, Leaks			
Air Belts	Hydraulics, Vibration, Cracks			
Overall Engine Compartment	Trash, Oil Buildup, Leaks, Smoking			
<b>On the Machine</b>				
Fire Extinguisher	Charge, Damage			
Lights	Damage			
Mirrors	Damage			
Vibration Vibration & Vibration	Vibration, Damage, Fuel Level			
Code Plate & Operators Manual	Present, Legible, Reflecting Attachment			
<b>Inside the Cab</b>				
ROPS (Roll Over Protection System)	Damage			
Seat	Adjustment			
Seat Belt & Mounting	Damage, Vibration, Adjustment			
Indicators & Gauges	Test for proper function			
horn, Backup Alarm, Lights	Proper Function			
Overall Cab Interior	Cleanliness			
Comments:				

- Are cell phones, earphones, etc. allowed to be used while operating mobile equipment?



**NO CELL  
PHONES**



- **What rule or method must be used when mounting and dismounting mobile equipment?**

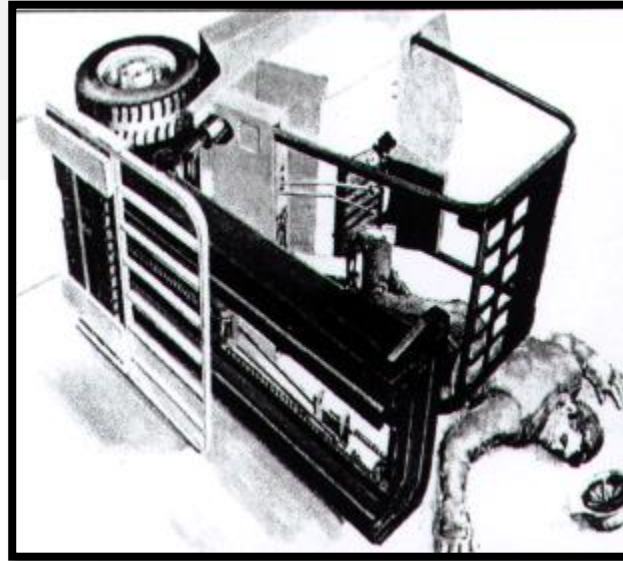
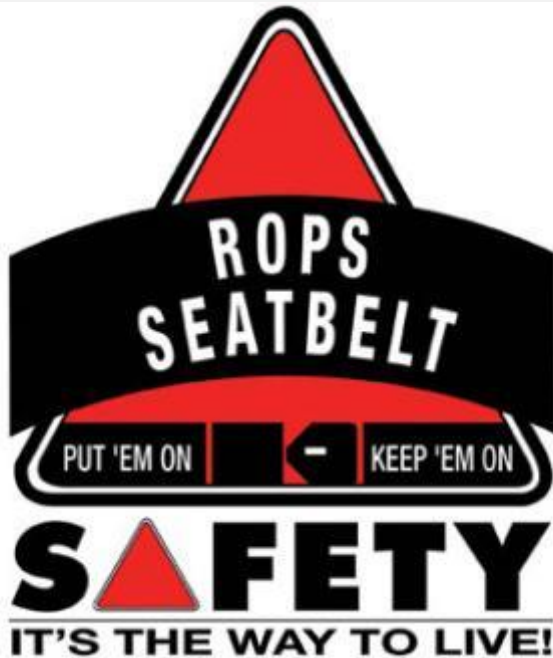


**3 Points of Contact**

- **What is the proper way to dismount a skid steer?**



- What must be in place before placing any piece of mobile equipment into motion?



- **Does a skid steer's lap bar take the place of the seatbelt?**

- No, the seat belt must always be worn with the lap bar.



- **What are the steps to safely enter a trailer with a piece of mobile equipment?**
  1. Make sure brakes are set.
  2. Chock trailer wheels
  3. Jack stand in place if the truck is not connected
  4. Check condition of floor/sides
  5. Dock plate is secure
  6. Secure keys from driver, dock lock, etc.

- **When is a piece of mobile equipment considered unattended?**

1. Operator is more than 25 feet away

**Or**

2. Piece of equipment is out of the operators sight

- **What piece of mobile equipment is the exception to the unattended rule?**

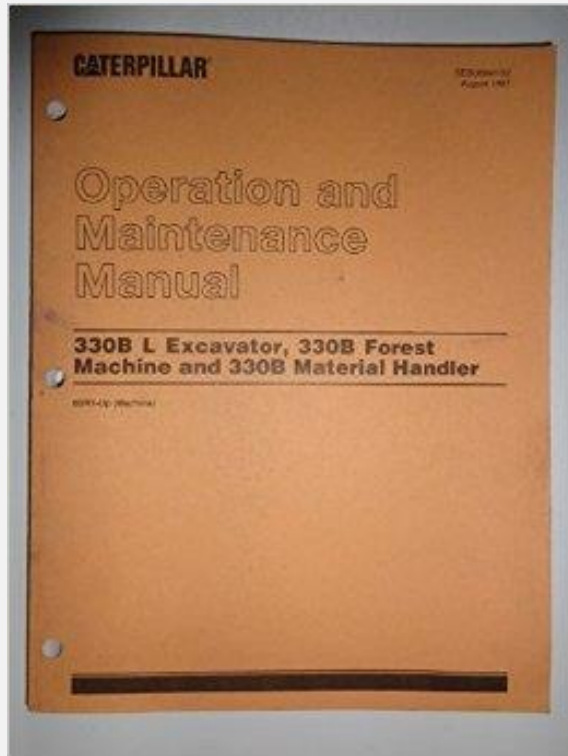


Why?

- **When can a piece of equipment exceed its rated capacity?**

**NEVER**

- Where can the rated capacities be found?



**TOYOTA FORKLIFT TRUCK**

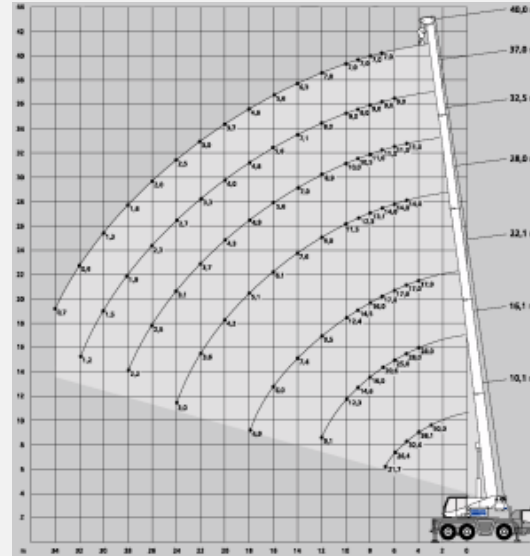
MODEL	7FGCU25	SERIAL NO.	97847 2-06
MAST	F3U	BACK TILT	5
TYPE	LP	ATTACH	FORKS
FRONT TREAD	35 in	TIRE FR	21x7x15/SOLID
TREAD	385 mm	SIZE RR	16x5x10-1/2/SOLID
TRUCK WT.	8370 lb		
ACCURACY±5%	3800 kg		

RATED CAPACITY WITH VERTICAL MAST EQUIPPED AT MAX. LIFT HEIGHT "A" AS SHOWN

	A	B	C	CAPACITY
in 169	24	0	5000 lb	
mm 4300	600	0	2200 kg	
in 189	30	0	4350 lb	
mm 4800	760	0	1900 kg	

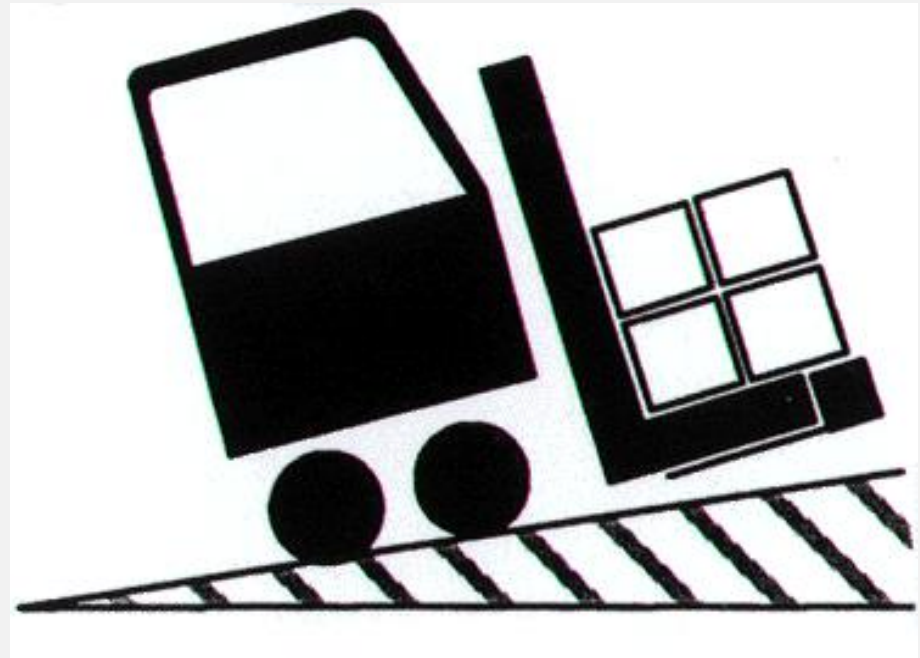
THIS FORKLIFT TRUCK MEETS OR EXCEEDS DESIGN SPECIFICATIONS OF ASME/ANSI B56.1 IN EFFECT ON THE DATE OF MANUFACTURE.

**WARNING** IMPROPER OPERATION OR MAINTENANCE COULD RESULT IN INJURY OR DEATH. TRAINED OPERATORS ONLY. READ OPERATOR'S MANUAL FIRST. 57846-U3172-79



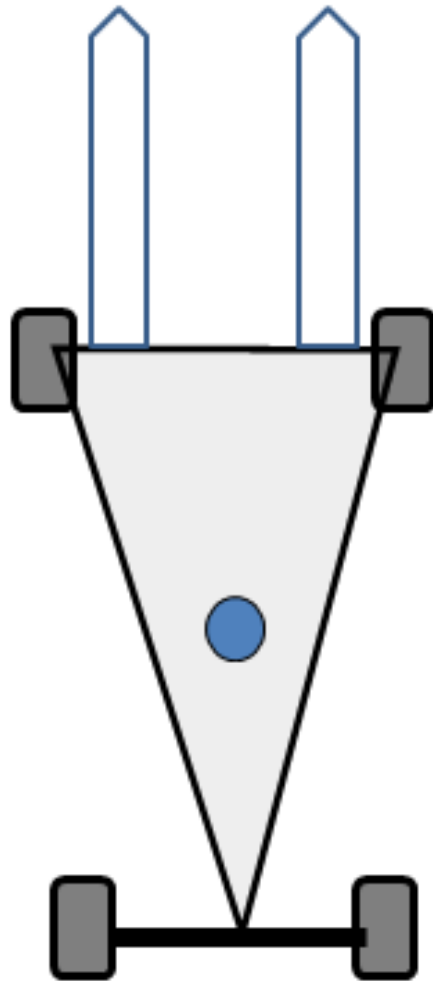
- **What direction does a loaded piece of equipment always need to face on a slope?**

- Loaded forks or bucket need to face UP the slope at all times.
- Never attempt to turn on a slope.

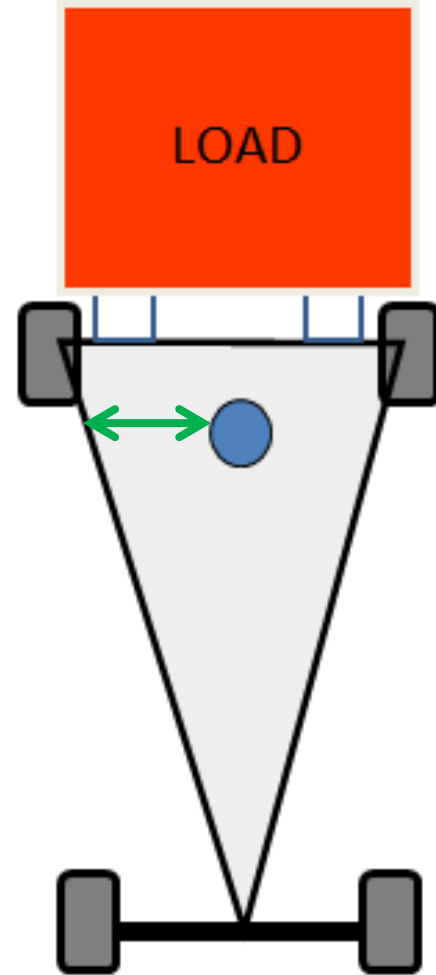


# UNDERSTANDING YOUR LIFT TRUCK

## BASIC PRINCIPALS OF A LIFT TRUCK:



**Which Lift Truck is  
More Stable When  
Making Turns?  
Why?**



- **Why do we carry loads as close to the ground as possible?**

- Center of gravity and the stability triangle.



- **Who is responsible for pedestrian safety around mobile equipment?**
  - Ultimately the operator, but pedestrians have responsibility too.
  - “10 foot rule”

- **How many employees are needed to safely complete rail movements?**

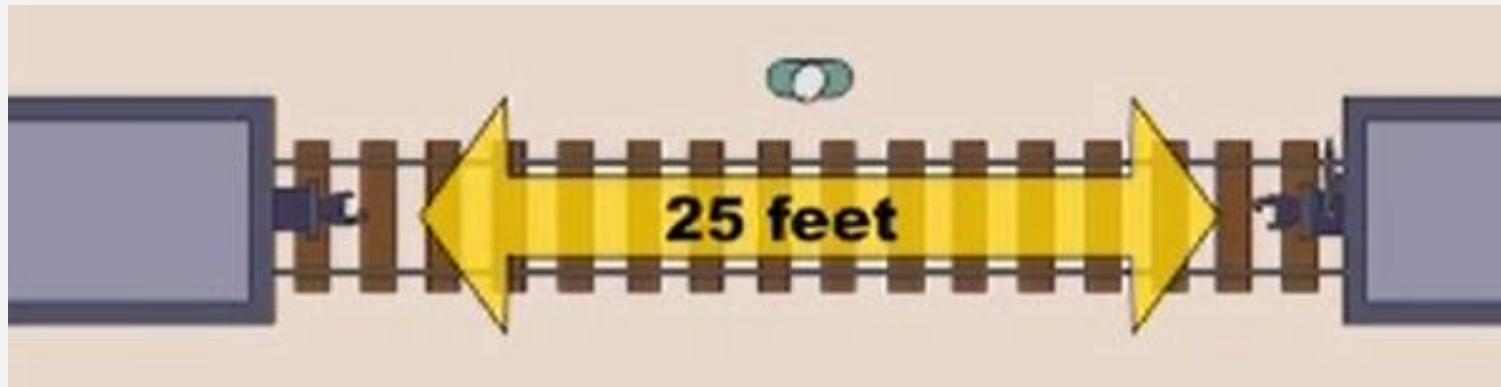
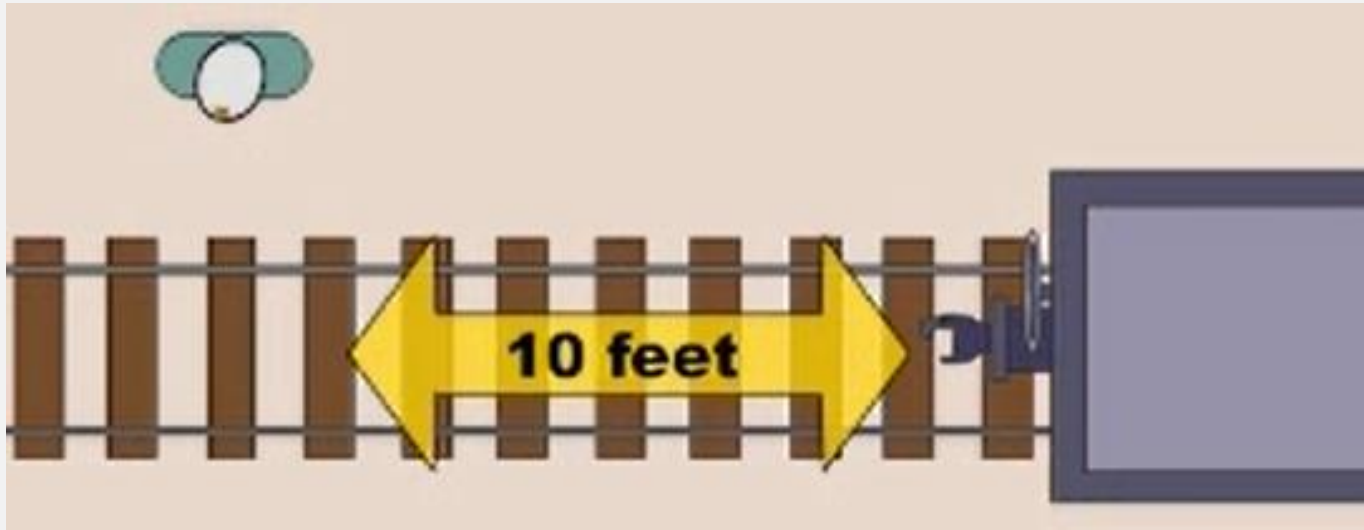
- Min. of Two.
- ALWAYS work in pairs when operating rail equipment.
- There should be one conductor (switchman) and one engineer.



- **Is it safe to walk or stand on the tracks?**
- No, it is never safe to walk or stand in the “line of fire” or in the gauge.

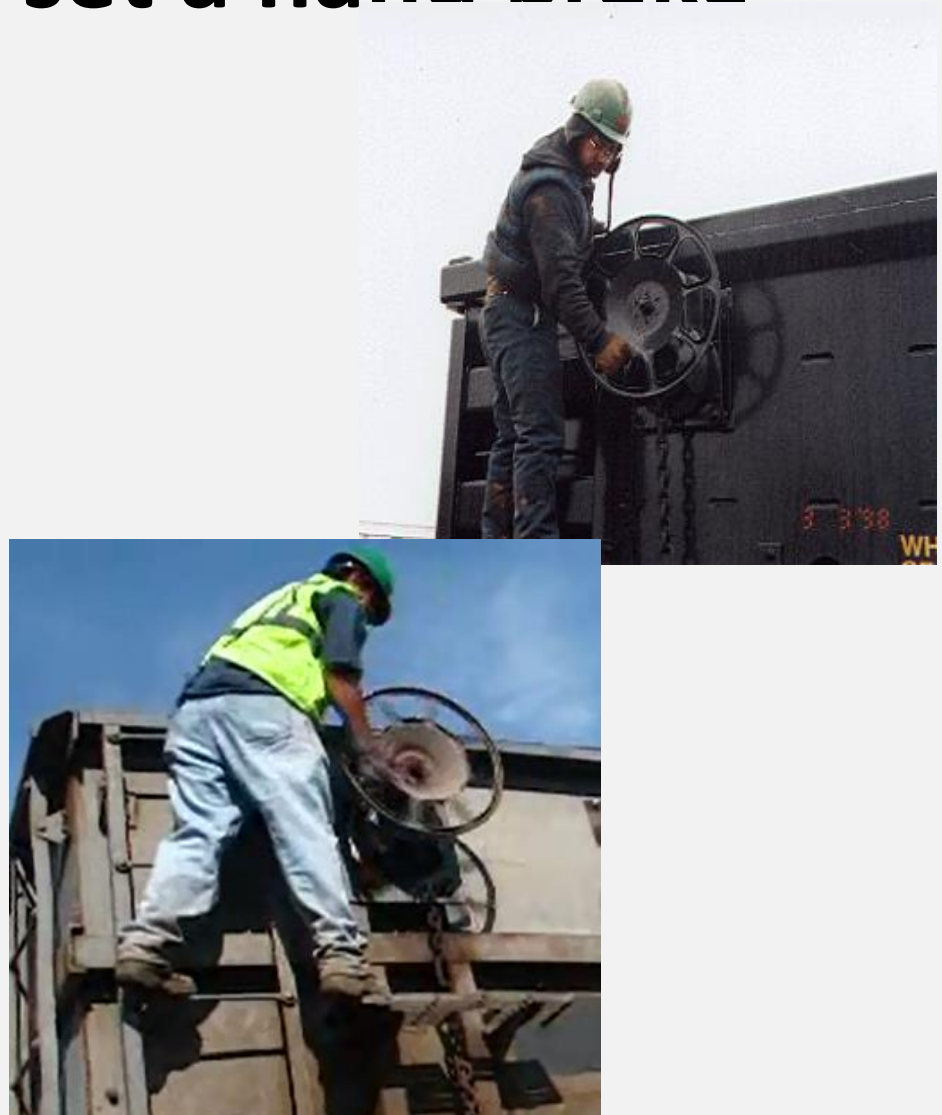


- How far should you be from the end of a railcar before crossing?



- **Is it acceptable to set a hand brake from the ground?**

- No, hand brakes must be set from the brake platform.
- Reduces risk of back strain and standing in front of railcars.



- **Where should the spotter be standing while coupling cars?**



- 3'+ off the side of the tracks.
- Never authorize movement until completely clear.
- Never reach in to make last second adjustments to knuckle.

# Questions?